

## **ABSTRACT OF THE DISCLOSURE**

A fail-safe torque transducer system, and an automotive power steering torque sensor system employing the same utilizing a two-stage series coupled torsion bar system. The first stage torsion bar is used to provide low torsion rate tuning of the steering system, and provides a lower torsional spring rate by reducing its diameter, also  
5 resulting in higher stresses in this stage. The second stage torsion bar is larger in diameter than the first and provides the stress/strain indicia referenced by the torque-measuring device. The second stage torsion bar, being stiffer and larger in diameter, is stressed at a lower level than the first stage. The second stage bar therefore has a higher cycle life than that of the first stage bar. Moreover, if stress related failure ever occurs, it  
10 will only occur in the first stage torsion bar. Any failure of the first stage will prevent any torque from reaching the second stage, thereby causing a zero strain signal and thus rendering the system fail-safe and not subject to instability of vehicle steering if the torsion bar breaks.